Australian and New Zealand Association of
ORAL & MAXILLOFACIAL SURGEONS

DENTAL IMPLANTS

People who have missing teeth may benefit from techniques that allow artificial teeth to be implanted firmly in the mouth.

These techniques range from replacing one missing tooth to replacing most teeth in the upper and lower jaws.

Dental implants have become an important part of modern dentistry, and millions of people around the world have had a variety of implants.

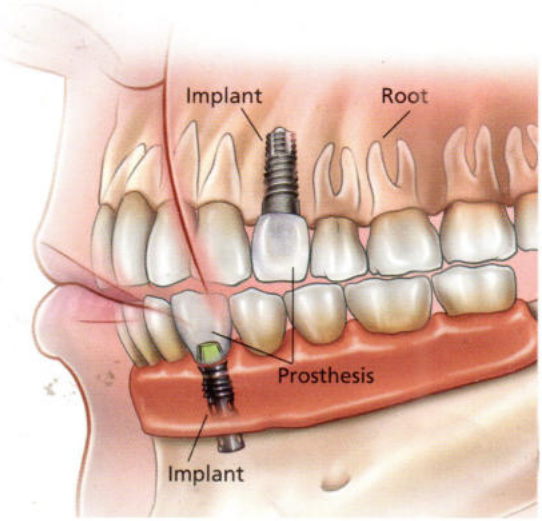
As shown in the figure (right), the basic structure consists of the implant fixture and the prosthesis.

Implant: An implant fixture is inserted into the jaw bone to provide a base for supporting and attaching the prosthesis.

Prosthesis: A prosthesis is an artificial tooth, or row of artificial teeth, attached to the implant. The prosthesis may be a "crown" to replace one missing tooth or a "bridge" to replace several missing teeth. In a jaw with no teeth, the prosthesis covers almost the full dental arch. Some prostheses with many teeth are fixed permanently onto the implants with screws or special cement. Other types of prostheses can be taken out for daily cleaning. These are called "over-dentures".

Implant designs, materials and techniques have improved greatly over the past 20 years and are continuing to improve. Many different types of implants and prostheses are available for people with different needs.

Implants may be made of different materials and implanted in different ways. Each has its own advantages and disadvantages. You and your surgeon can discuss which is likely to be best for you.



Why dental implants are useful

As implants provide points of firm attachment for dental prostheses, they can help solve problems posed by traditional dentures and bridges.

Many people have reported that dental implants are more comfortable, convenient and attractive than the dentures they had previously worn.

They also report fewer problems when eating and talking. Biting and chewing are often very similar to biting and chewing with normal teeth.

In order to get bridges to fit correctly, adjacent healthy teeth need to be cut and reshaped, which damages them.

In contrast, adjacent natural teeth do not have to be altered or damaged when implants are used.

Bonding of the implant and jaw bone

Implants are made of materials (such as the metal titanium) that are compatible with, and can bond strongly to, bone tissue.

The bone tissue grows onto the surface of the implant. This is called "osseointegration" and "biointegration". You may hear your surgeon use these terms.

When fixed firmly within the jaw bone, the implant will be strong enough to bear the daily forces of chewing and normal function.

ASK YOUR SURGEON

This pamphlet is intended to provide you with general information. It does not contain all known facts about dental implants and possible side effects. If you are not sure about the benefits, risks and limitations of dental implants, ask your surgeon. Read this information carefully, and make a list of questions you want to ask your surgeon.

An oral and maxillofacial surgeon is specially trained in surgery of the mouth, teeth, gums and jaws. Your surgeon will be able to answer questions or concerns you may have about the need for implants, the different types of implants, the procedure and the chances for success. Your surgeon will work with a prosthodontist or a dentist to plan and complete your total implant treatment.

This pamphlet is not a substitute for advice from your surgeon and should be used only in consultation with your surgeon.

YOUR SURGEON

Important: Fill in all details on the sticker below.

Dear Surgeon: After you discuss this pamphlet with your patient, fill in the information on this sticker, peel it off, and put it on the patient's medical history or card. This will remind you and your patient that this pamphlet has been given to the patient. Some surgeons ask their patients to sign the sticker.

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WHO MAY BENEFIT FROM IMPLANTS

Young people: Oral and maxillofacial surgeons and prosthodontists usually recommend a minimum age of 16 or 17, when bone growth has stopped.

Adults: Implants have been successfully used in adults of all ages, including the elderly.

Chronically ill people: Some people with chronic illnesses find it very difficult to chew food with dentures. Implants may be a better option.

Patient selection: To make certain that a person understands the need to complete the course of treatment and will benefit from dental implants, the surgeon will carry out a thorough examination and ask questions.

The decision to have dental implants

After an examination, your surgeon will discuss whether you are likely to benefit from dental implants. Take an active role in your implant therapy and the making of decisions. The decision to have implants is always yours. You should not be pressured by anyone.

If you decide to have implants, your surgeon will ask you to sign a consent form. Read it carefully. If you have any questions about the form, the implants, surgery or anything else, ask your surgeon.

Your dental and medical history

Your surgeon will ask you about any problems you may have had with your health and teeth. Your surgeon needs to know because some problems may interfere with the implant surgery, the anaesthesia (local or general), and care after surgery. This information helps the surgeon to plan the best possible treatment. Tell your surgeon if you have:

- bled too much when you were injured or had surgery
- any blood disorders, such as haemophilia
- had heart surgery
- had radiotherapy to your face or jaws
- had any problems with previous dental implant treatment
- osteoporosis and are having treatment for it
- any condition requiring long-term steroid treatment.

Medicines

Give your surgeon a list of all medicines you are taking now or have been taking recently. This includes any bisphosphonate medication (taken for osteoporosis or other bone conditions), the "Pill" or any over-the-counter medicines, such as aspirin or cough medicine.

When implant therapy should not be done

Some people should not have, or should delay having, implants for the following reasons:

- unrealistic expectations: A realistic outlook is important. Implant therapy is not successful for everyone. Some reconstructions can be very difficult, and the results may not be as good as the patient had hoped.
- pregnancy: Tell your surgeon if you are or may be pregnant. General anaesthesia is likely to be an unnecessary risk for the mother and baby. Pregnancy could affect treatment with pain killers, antibiotic drugs and other medicines. Pregnant women should wait until they have given birth before starting implant therapy.
- severe, chronic illness: These people may not be able to withstand general anaesthesia and may not be able to maintain the oral hygiene required for implants.
- not enough jaw bone: If too much jaw bone has been lost due to ageing and extraction of teeth, the implant will not have enough bone to hold it (see "Bone grafts and regeneration", below).
- any conditions, diseases or treatments that delay healing
- inability or poor motivation to maintain oral hygiene
- psychiatric disorders: Some disorders may affect the ability to understand and comply with all the instructions.
- abuse of alcohol and drugs, and drug dependency: These may interfere with good nutrition, ability to follow the surgeon's advice, maintenance of oral hygiene, and healing and osseointegration of the implant.
- bisphosphonate therapy: bisphosphonates decrease bone turnover so implants may fail to integrate or later may lose integration. The risk is low with oral bisphosphonates (about 1%) but high with intravenous bisphosphonates (about 15%).

Bone grafts and regeneration

In some patients, bone may need to be grafted onto the jaw bone. The grafts will provide extra bone to hold the implants. The bone is usually taken from another part of the jaw or from the hip.

In patients who do not have enough bone in the jaw, more bone can be encouraged to grow using a method called "guided-tissue regeneration". If you require bone grafts or guided-tissue regeneration, your surgeon will discuss it with you.

Smoking

Your surgeon may decline to treat you if you continue to smoke. Smoking can cause failure of the implant to bond with the jaw bone. Smoking can significantly increase the risk of failure. To improve the chances of success, do not smoke.

Where to have the implant surgery

Your surgeon will advise you whether the implant surgery has to be done in the surgery, hospital or in a day-surgery centre. If you have to go into a hospital, your surgeon may want you to have some tests. This is routine procedure.

Anaesthesia

Local anaesthetic: If one or only a few implants will be inserted, your surgeon may give you a local anaesthetic with a needle. The local anaesthetic will numb the gums and lower parts of the face.

General anaesthesia: For some people, the surgeon may recommend general anaesthesia, that is, putting them to sleep. General anaesthesia is given by a specialist anaesthetist. It may be preferred in people who:

- will have many implants inserted into the lower jaw, the upper jaw, or both
- do not want to remain awake during the surgery
- will need bone grafting.

Modern anaesthesia is safe with few risks. However, a few people may have a serious reaction to an anaesthetic.

If you have had a reaction to an anaesthetic drug, tell your surgeon.

Before surgery, your surgeon or anaesthetist will give you instructions to follow regarding eating and drinking.

If you are concerned about anything after your surgery, contact your surgeon. A 24-hour telephone number is available. Ask your surgeon for the emergency number in your area.

EMERGENCY NUMBER

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Implant Surgery

1 Preparation of implant hole 2 Insertion of the implant 3 Healing of operated site 4 Attachment of the prosthesis

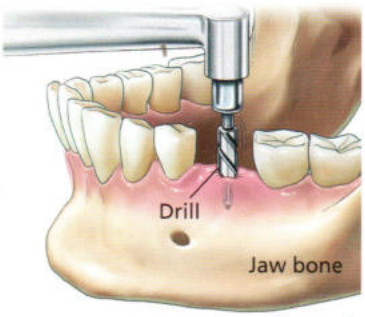

Figure 1

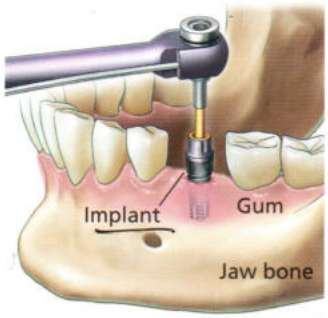

Figure 2

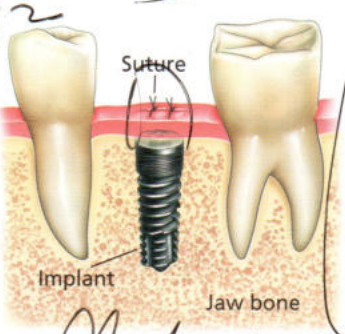

Figure 3

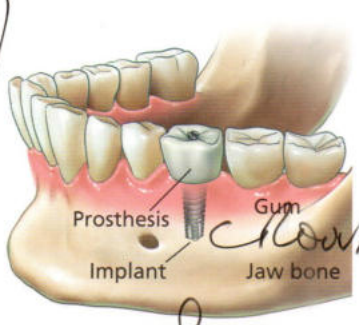

Figure 4

Your surgeon makes an incision to open your gums. The implant is inserted into the jaw bone using special techniques and instruments (Figures 1 and 2). Various implants have been developed. Not all are inserted into the bone as shown in the figures. Ask your surgeon whether your implant is different. Information from the manufacturer may have illustrations showing how the implant is fitted.

The number of implants inserted by the surgeon depends on the prosthesis. For example, one implant is used for replacing one missing tooth. Or, for a complete upper prosthesis having 12 artificial teeth, six or more implants may be needed.

The incision is closed with stitches. Some stitches dissolve after a few days. Other stitches are removed by your surgeon. The bone surrounding the implant is allowed to heal for up to six months (Figure 3).

Insertion of abutments

After healing, an "abutment" is inserted through the gums and into the implant. This can be done under a local anaesthetic. The abutment is the foundation, support or connector for the prosthesis. The gums around the abutments are left to heal for several weeks. If the bone is adequate the abutment may be inserted at the same time as the implant.

Fitting the prosthesis

Your surgeon, prosthodontist or dentist will test the implants to see if they have integrated with the bone. The implants must be strong enough to support the prosthesis and withstand the forces of chewing and normal function.

If the implants have been successful, your prosthodontist or dentist will begin work on the prosthesis. The prosthesis may be fixed to the implant with cement or screws so that it is not removable (Figure 4). Or, it may be attached in a way that allows it to be removed for cleaning. These are called "overdentures".

When the impressions of your mouth are made and before the prosthesis is finished, discuss the appearance of the prosthesis with your dentist or prosthodontist. If you have ideas or concerns about the appearance of the prosthesis, discuss them with your dentist or prosthodontist.

Single-stage procedure

Some surgeons use a single-stage procedure, where the abutment and prosthesis are placed at the same time as the implant fixture.

The advantage is that the patient may get a temporary crown right away and the final restoration more quickly. This technique is not suitable for all patients.

Oral hygiene

Cleanliness is crucial. Implants, prostheses, gums and teeth must be thoroughly cleaned every day so they stay free of dental plaque. Attention to cleanliness will improve the chances of success.

Your surgeon, prosthodontist or dentist will give you instructions on cleaning. If you cannot maintain rigorous cleaning, tell your surgeon, prosthodontist or dentist. Implant hygiene is a life-time commitment for the patient and dentist.

After implant surgery

- Rest at home after the surgery.
- Some people have to take several days off work, school or other duties.
- Do not drink beer, wine, spirits or other alcoholic drinks while you are taking pain killers or antibiotics.
- Eat soft foods such as soups, blended (pureed) vegetables and meats for the first few days.
- Drink a lot of fluids.
- Ice packs may reduce swelling and pain.

Success Rates

The short-term success and long-term success of the implants depend on a number of factors, including:

- the health of the jaw bone and its capacity to heal well
- the type of implant
- the number of implants and the type of prosthesis
- whether the implants are in the upper jaw or the lower jaw
- the general health of the patient
- the skill of the surgeon.

About 95 patients in every 100 can expect to have successful treatment. However, it is difficult to predict how long an implant will work properly in a particular person. Most remain in place and function properly for 10 years and often more.

In some people, every implant will be successful, but in other people the implants may not integrate well with the jaw bone.

While implants are not successful for everyone, they are effective in most people.

Your surgeon will have more complete information about the likely long-term success of the implant system which he or she believes will work best for you.

Possible Side Effects and Complications Of Dental Implants

All types of surgery have risks. Complications can occur despite the highest standards of practice. Your surgeon will assess any risks that the implants or prostheses may cause to your general or dental health. Health checks will occur during treatment and follow-up. If a side effect occurs, it is usually during the first 12 months. Serious complications rarely occur after 12 months. If you have a side effect due to the implant, tell your surgeon, prosthodontist or dentist. The following list is intended to inform you about possible problems, not to alarm you. There may be others not listed here.

Short-term problems

Pain and swelling: The amount of pain and swelling near the implant site usually depends on the number of implants inserted into the jaw. Pain (or discomfort) and swelling may last for several days.

Pain may be minor in some people and greater in others. Your surgeon can prescribe a pain reliever. Pain usually starts to decrease after the second day, but some people may need pain relief after one week. If pain does not lessen as the days go by, tell your surgeon.

Implant failure: One implant or more may fail to integrate properly with the jaw bone. Your surgeon may have to remove the implant and insert another implant in nearby bone. Or, after the failed implant has been removed, another implant may be inserted at the same place after the bone has healed thoroughly.

Speech: A few people may have trouble with speech after the prosthesis is fitted. This is often a matter of getting used to the prosthesis. If the problem is persistent, speech therapy may be needed. Some people report improvement in their speech after the prosthesis is fitted.

Gingivitis: Inflammation of the gums can occur around an implant or tooth. Gingivitis is caused by poor oral hygiene, not usually by implant surgery. Gingivitis can cause pain in some people.

Perforation of nasal sinus: The tip of some implants may be inserted into the nasal sinus floor. This can rarely cause infection. In most cases, the infection can be readily controlled.

Haemorrhage: In rare cases, patients have had life-threatening bleeding (haemorrhage) from the floor of the mouth.

Long-term problems

Infections: An infection may occur around the implant (local) or in distant areas of the body (systemic). In a few vulnerable people, "infective endocarditis" may occur. This is an infection within the heart and can be life threatening. Tell your surgeon if you have had heart surgery of any kind, including the replacement of a heart valve.

Infections are treated with antibiotics. If an infection cannot be cured, the dental implant may have to be removed. (See the patient education pamphlet "Prevention of heart infection following dental treatment", prepared by the Australian Dental Association).

Serious infections usually are not related to the implants but may begin when implants are inserted. After implant surgery, if you have lasting pain around the implants, have a fever or feel generally unwell, tell your surgeon.

Nerve injury: Implants can press against major nerves in the jaw and bruise them. This can cause numbness, tingling and loss of feeling in the gums, cheeks, lips, chin, tongue and around the upper and lower jaws. If a nerve is injured, it usually will heal. As it heals, numbness, tingling and pain resolve. In some people, complete healing of the nerve may take six to 18 months. In rare cases, the nerve may not heal completely. Rarely, patients have reported chronic pain. Numbness or altered sensation may be permanent and may cause significant discomfort.

Bone loss: In some people, implant treatment may worsen the bone loss in the area surrounding the implant.

Build-up of tissue (hyperplasia): Gum tissue may build up around the top of the implant where it protrudes through the gums. This is called "hyperplasia" and can be unsightly. The area may be tender and red, and may require surgery. Poor oral hygiene can make it worse.

Crown fracture: A part of the prosthesis can fracture or chip. If the problem is serious, a new prosthesis may have to be made and fitted again.

Loose prosthesis: The special screws that fix the abutment to the implant fixture, or the prosthesis to the abutment, may loosen. This can cause the prosthesis to feel loose. The cause should be found, and then the screws should be removed, replaced and tightened.

Fracture of the jaw bone: Implant surgery can, in rare cases, cause a jaw bone to fracture. This can be painful and may require further specialist treatment.

Swallowing an implant component: Small components of an implant or an instrument can be swallowed or inhaled during surgery. This may happen even though the surgery is carried out with care and skill. It can cause serious infection and other complications. Surgery may be needed to recover the item.

Adjacent tooth: In rare cases, a tooth adjacent to an implant may be adversely affected and have to undergo root canal treatment or, uncommonly, extraction.

Osteonecrosis: Patients taking a bisphosphonate have an increased risk of necrosis of the jaw bone near the operated site and infection around the implant. This may cause implant failure. Patients planning to have implants and taking a bisphosphonate should discuss risks with their surgeon. Patients with implants have a small risk of loss of integration if later they start bisphosphonate treatment for bone disease. (See the patient education pamphlet "Oral health and bisphosphonates medication", prepared by the Australian Dental Association.)

FOLLOW-UP

A one-year, three-year and five-year follow-up is important to assess gum health around the implant and determine whether bone loss is taking place. If this is detected early, very often the condition can be treated and the progression of the bone loss stopped. It is advisable to ensure that these appointments are made and attended to prevent irretrievable bone loss around the implants.

COST OF IMPLANT THERAPY

You should ask your surgeon, prosthodontist and dentist for an estimate of all costs and fees of the implant therapy. If the implants cause difficulties, there may be extra costs. Your health fund can advise you about rebates.

As the treatment and outcome may become different from what was first proposed, the final account may be different from the original estimate. It is best to discuss costs before and during treatment, rather than afterwards.

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